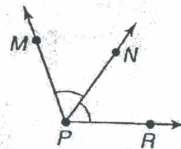


1-4

(day 3)

Angle Measure

Congruent Angles Angles that have the same measure are congruent angles. A ray that divides an angle into two congruent angles is called an **angle bisector**. In the figure, \overline{PN} is the angle bisector of $\angle MPR$. Point N lies in the interior of $\angle MPR$ and $\angle MPN \cong \angle NPR$.

**Example**

Refer to the figure above. If $m\angle MPN = 2x + 14$ and $m\angle NPR = x + 34$, find x and find $m\angle MPR$.

Since \overline{PN} bisects $\angle MPR$, $\angle MPN \cong \angle NPR$, or $m\angle MPN = m\angle NPR$.

$$\begin{aligned} 2x + 14 &= x + 34 & m\angle NPR &= (2x + 14) + (x + 34) \\ 2x + 14 - x &= x + 34 - x & &= 54 + 54 \\ x + 14 &= 34 & &= 108 \\ x + 14 - 14 &= 34 - 14 \\ x &= 20 \end{aligned}$$

Exercises

\overline{QS} bisects $\angle PQT$, and \overline{QP} and \overline{QR} are opposite rays.

1. If $m\angle PQT = 60$ and $m\angle PQS = 4x + 14$, find the value of x .

$$\begin{aligned} 4x + 14 + 4x + 14 &= 60 & 8x &= 32 \\ 8x + 28 &= 60 & x &= 4 \end{aligned}$$

2. If $m\angle PQS = 3x + 13$ and $m\angle SQT = 6x - 2$, find $m\angle PQT$.

$$\begin{aligned} 3x + 13 &= 6x - 2 & m\angle PQT &= m\angle PQS + m\angle SQT \\ 13 &= 3x - 2 & &= 3x + 13 + 6x - 2 \\ 15 &= 3x & &= 9x + 11 \\ x &= 5 \end{aligned}$$

\overline{BA} and \overline{BC} are opposite rays, \overline{BF} bisects $\angle CBE$, and \overline{BD} bisects $\angle ABE$.

3. If $m\angle EBF = 6x + 4$ and $m\angle CBF = 7x - 2$, find $m\angle EBC$.

$$\begin{aligned} 6x + 4 &= 7x - 2 & m\angle EBC &= 6x + 4 + 7x - 2 \\ 6 &= x & &= 13x + 2 \\ & & &= 13(6) + 2 \\ & & &= 80^\circ \end{aligned}$$

4. If $m\angle 1 = 4x + 10$ and $m\angle 2 = 5x$, find $m\angle 2$.

$$\begin{aligned} 4x + 10 &= 5x & m\angle 2 &= 5x \\ 10 &= x & &= 5(10) = 50^\circ \end{aligned}$$

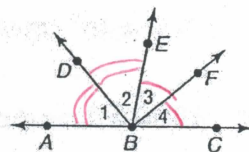
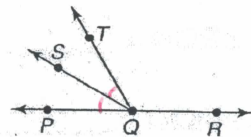
5. If $m\angle 2 = 6y + 2$ and $m\angle 1 = 8y - 14$, find $m\angle ABE$.

$$\begin{aligned} 6y + 2 &= 8y - 14 & m\angle ABE &= 6y + 2 + 8y - 14 \\ 16 &= 2y & &= 14y - 12 \\ y &= 8 \end{aligned}$$

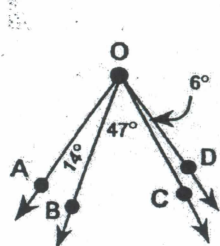
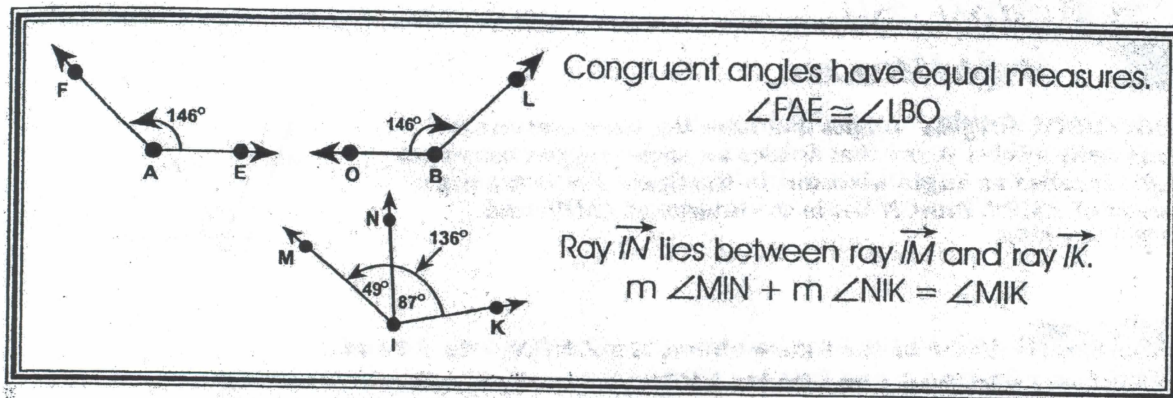
6. Is $\angle DBF$ a right angle? Explain.

No, A RIGHT ANGLE
= 90°

$$\begin{aligned} &= 14(8) - 12 \\ &= 112 - 12 = 100^\circ \end{aligned}$$



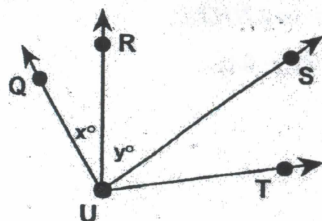
Congruence and Addition Properties of Angles



1. $m\angle AOC = \underline{61^\circ}$

2. $m\angle BOD = \underline{53^\circ}$

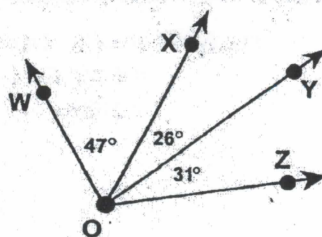
3. $m\angle AOD = \underline{67^\circ}$



4. $m\angle QUS = m\angle RUS + \underline{m\angle QUR}$

5. $m\angle QUR + m\angle RUT = \underline{m\angle QUT}$

6. $m\angle SUR + m\angle SUT = \underline{m\angle RUT}$



7. If $m\angle QUS = 72^\circ$ and $y = 46^\circ$, $m\angle RUQ = \underline{26^\circ}$

8. If $m\angle SUR = 46^\circ$ and $m\angle SUT = 31^\circ$, $m\angle RUT = \underline{77^\circ}$

9. If $m\angle QUR = 26^\circ$ and $m\angle RUT = 77^\circ$, $m\angle QUT = \underline{103^\circ}$

10. $m\angle WOX = \underline{47^\circ}$

14. $m\angle XOY + m\angle YOZ = \underline{m\angle XOZ}$

11. $m\angle XOZ = \underline{57^\circ}$

15. $m\angle WOY = \underline{m\angle WOX} + m\angle XOY$

12. $m\angle WOY = \underline{73^\circ}$

16. If $m\angle GAH = 15^\circ$, $m\angle IAJ = \underline{15^\circ}$

13. $m\angle WOZ = m\angle WOY + \underline{m\angle YOZ}$

17. $m\angle GAJ = \underline{m\angle GAI} + m\angle IAJ$